Initial Statement of Reasons
Interim Enhanced Surface Water Treatment Rule
Title 22, California Code of Regulations

All suppliers of domestic water to the public are subject to regulations adopted by the U.S. Environmental Protection Agency (USEPA) under the Safe Drinking Water Act of 1974, as amended (42 U.S.C. § 300f et seq.) as well as by the California Department of Health Services (Department) under the California Safe Drinking Water Act (Health & Saf. Code, div. 104, pt. 12, ch. 4, § 116270 et seq.)

On December 16, 1998, the USEPA promulgated the Interim Enhanced Surface Water Treatment Rule (63 Fed. Reg. 69478; amended Jan. 16, 2001, 66 Fed. Reg. 3770), as required by the Safe Drinking Water Act Amendments of 1996 (SDWAA), which provides increased public protection against microbial pathogens, specifically the protozoan *Cryptosporidium*. Additionally, on June 8, 2001 the USEPA promulgated the Filter Backwash Recycling Rule (66 Fed. Reg. 31086), also as required by the SDWAA.

California has been granted "primacy" for the enforcement of the SDWAA. To receive and maintain primacy, states must promulgate regulations that are no less stringent than the federal regulations. The Department is proposing these regulations to fulfill the federal primacy requirements.

California currently requires water suppliers to filter and disinfect surface water and groundwater under the influence of surface water. (Cal. Code Regs., tit. 22, div. 4, ch. 17, § 64650 et seq.) Pursuant to federal primacy requirements and Health and Safety Code (H&S Code) section 116375, the Department proposes the following regulations that would reduce turbidity limits and increase monitoring requirements for surface water treatment facilities.

The Department proposes the following amendments to chapter 17, division 4, title 22, California Code of Regulations (CCR).

- To amend the following to update references to outdated section numbers:
  - Section 64651.10
  - Section 64658(a)
  - Section 64662(b)

- To amend the following to correct typographical errors:
  - Section 64651.53
  - Sections 64652.5(a) and (c)
  - Sections 64654(c)(1), (2), and (3)
  - Section 64660(b)(1)
  - Section 64664(e) (formerly (d)), references to operating criteria specified in sections 64660(b)(6) and (8) replaced with sections 64660(b)(7) and (9).

- To amend the following to consistently use the term *Giardia lamblia* in lieu of *Giardia*, Giardia lamblia, and *Giardia* lamblia:

- Section 64650(a)
- Section 64651.50
- Section 64652(a)(1)
- Sections 64652.5(e), (e)(4), (k)(1), and (l)
- Sections 64653(b) and (f)
- Section 64654(a)
- Section 64660(b)(5)(A)

- To amend the following to accommodate the insertion of new subsections:
  - Former section 64652(d) is re-assigned as 64652(e)
  - Former sections 64655(b)-(d) are re-assigned as 64655(e)-(g)
  - Section 64655(e) (formerly (b)) is amended to update new section references
  - Former sections 64664(d) and (e) are re-assigned as 64664(e) and (f)

- To revise chapter 17 by adopting the following, pursuant to federal primacy requirements:
  - Section 64651.21 Definition of comprehensive performance evaluation
  - Section 64651.34 Definition of disinfection profile
  - Section 64651.38 Definition of filter profile
  - Section 64651.88 Definition of uncovered finished water storage facility
  - Section 64652(d)
  - Section 64653(c)(3)
  - Section 64653.5
  - Section 64655(h)
  - Section 64657 General requirements
  - Section 64657.10 Criteria for avoiding filtration
  - Section 64657.20 Disinfection profiling and benchmarking
  - Section 64657.30 Filtration
  - Section 64657.40 Filtration sampling
  - Section 64657.50 Supplemental reporting and recordkeeping
  - Section 64660(b)(5)(C)
  - Section 64664(g)

- To revise chapter 17 by amending the following, pursuant to federal primacy requirements:
  - Section 64650(a)
  - Section 64651.50
  - Sections 64652.5(a) and (i)
  - Section 64653(f)
  - Sections 64662(a)(1) and (b)
  - Sections 64666(a) and (b)

The following proposed amendments contain additional requirements or provisions that are not found in the Federal Register:

- To amend section 64651.60 to correct the definition and update the reference to the approved analytical methods.
- To amend section 64654(b)(2) to clarify compliance requirements.
- To amend section 64655 to provide a more appropriate title for the section.
- To adopt section 64655(b), requiring the monthly monitoring of source water for total coliform and either fecal coliform or *E. coli* bacteria.
- To adopt section 64655(c), requiring the daily monitoring of settled water for turbidity.
- To adopt section 64655(d), requiring the monitoring of recycled backwash water for turbidity and flow.
- To amend section 64661(a) to clarify that all treatment plants shall operate under an approved operations plan.
- To amend section 64661(b) to require the inclusion of a filter media inspection program in the operations plan.
- To amend section 64663(a) to include Department notification whenever monitoring conducted pursuant to section 64657.40 indicates a combined filter effluent in exceedance of 5.0 Nephelometric Turbidity Units (NTU).
- To amend section 64663(b) to include Department notification whenever samples collected pursuant to section 64657.40 exceeds 1 NTU for more than 1 hour or 1.0 NTU for more than 8 hours.
- To adopt section 64664(d) to require in the monthly report the inclusion of analytical results of raw and process water samples collected pursuant to sections 64655(a)-(d).
- To amend section 64664(e) (formerly 64664(d)) to include violations of performance standards specified in section 64657.30.
- To amend section 64666(c) to refer to sections 64463.1 and 64463.4 as a whole, as opposed to specific subsections within those sections.

The net effect would be that:

- Suppliers using an approved surface water source and serving at least 10,000 people would be required to provide at least 99 percent removal of *Cryptosporidium* oocysts, which would be accomplished through the attainment of more stringent turbidity standards.
- Suppliers using an approved surface water source and serving at least 10,000 people would be required to determine their annual average concentration of total trihalomethanes (TTHM) and haloacetic acids (HAA) (five), and if the annual averages exceed or equal either 0.064 mg/L or 0.048 mg/L respectively, the supplier would be required to conduct disinfection profiling and calculate a benchmark.
- All suppliers using an approved surface water source would be required to:
  - Provide the Department with information about filter backwash recycle flows and return such flows to the headworks of the treatment plant.
  - Conduct monthly source water monitoring for bacterial concentrations.
  - Conduct daily monitoring of settled water turbidity.
  - Conduct monitoring of recycled backwash water for turbidity and flow.
  - Include a filter media inspection program in the operations plan.

Adoption of these requirements would satisfy the federal primacy requirements related to the adoption of regulations at least as stringent as the federal.

Documents Incorporated by Reference
The following documents are incorporated by reference in the regulations as it would be too cumbersome, unduly expensive, or impractical to publish these documents into regulation.

1) 40 Code of Federal Regulations parts 141.172(a), (b), and (c) (63 Fed. Reg. 69477 (December 16, 1998)), "Interim Enhanced Surface Water Treatment Rule".

2) 40 Code of Federal Regulations parts 141.172(a) and (b) (66 Fed. Reg. 3769 (January 16, 2001)), "Revisions to the Interim Enhanced Surface Water Treatment Rule and Stage 1 Disinfectants and Disinfection Byproducts Rule".

3) 40 Code of Federal Regulations part 141.74(a)(1) (67 Fed. Reg. 65888 (October 29, 2002)), "Approval of Analytical Methods for Chemical and Microbiological Contaminants".

4) Optimizing Water Treatment Plant Performance Using the Composite Correction Program, EPA Handbook, Chapter 4, pages 21-65, Office of Research and Development, U.S. Environmental Protection Agency; EPA/625/6-91/027 (revised August 1998).

Article 1. General Requirements and Definitions

AMEND Section 64650 General requirements
An amendment to subsection (a) adds a reference to article 3.5, which establishes treatment techniques in lieu of maximum contaminant limits for *Cryptosporidium* for systems serving a population of at least 10,000 people. This is adopted for conformance with 40 C.FR. part 141.170(a), but has been revised to reference the applicable state regulation to avoid confusion.

AMEND Section 64651.10 Approved surface water
References to sections 4011 and 4016 are replaced with sections 116525 and 116550, respectively, for consistency with recodified statutes.

ADOPT Section 64651.21 Comprehensive performance evaluation (CPE)
The term "comprehensive performance evaluation" is used and defined in 40 C.F.R part 141.2. It is adopted here to provide clarification for the subsequent requirements and for conformance with the federal regulation, but has been modified to exclude listing the components of a CPE. The CPE components are in Optimizing Water Treatment Plant Performance Using the Composite Correction Program, EPA Handbook, Chapter 4, pages 21-65, Office of Research and Development, U.S. Environmental Protection Agency; EPA/625/6-91/027 (revised August 1998), which is incorporated by reference in section 64657.50(e).

ADOPT Section 64651.34 Disinfection profile
The term "disinfection profile" is used and defined in 40 C.F.R. part 141.2. It is adopted here to provide clarification for the subsequent requirements and for conformance with the federal

regulation, but has been revised to include virus inactivation for clarification. Disinfection profiling for virus inactivation is required in 40 C.F.R. part 141.172(b)(5).

ADOPT Section 64651.38 Filter profile
The term "filter profile" is used and defined in 40 C.F.R. part 141.2. It is adopted here to provide clarification for the subsequent requirements and for conformance with the federal regulation, but has been modified by (1) eliminating the redundant term "daily", as 40 C.F.R. part 141.172(b)(2) already identifies the monitoring frequency as "daily" and (2) replacing "assessment of filter performance with "data collected" for clarification.

AMEND Section 64651.50 Groundwater under the direct influence of surface water
A reference to *Cryptosporidium* is added to the definition, in conformance with 40 C.F.R. part 141.2. "Giardia lamblia" is replaced with "*Giardia lamblia*", as the rules of taxonomy is to show in italics the genus and species of an organism.

AMEND Section 64651.53 Legionella
A typographical error, "… type or pneumonia…" is replaced with "… type of pneumonia…" "Legionella" is replaced with "*Legionella*", as the rules of taxonomy is to show in italics the genus of an organism.

AMEND Section 64651.60 NTU (Nephelometric Turbidity Unit)
Errors in the definition are corrected and the reference to the approved analytical methods for turbidity is updated. This section incorporates by reference the requirements of 40 Code of Federal Regulations, part 141.74(a)(1) (67 Fed. Reg. 65888 (October 29, 2002)), "Approval of Analytical Methods for Chemical and Microbiological Contaminants", as it would be too cumbersome, unduly expensive, or impractical to publish this document into regulation.

ADOPT Section 64651.88 Uncovered finished water storage facility
This term is used and defined in 40 C.F.R. part 141.2. It is adopted here to provide clarification for the subsequent requirements and for conformance with the federal regulation, but has been revised to provide additional details to avoid confusion regarding the terminology "open to the atmosphere".

Article 2. Treatment requirement, watershed protection requirements, and performance standards

AMEND Section 64652(a)(1)
The term "*Giardia*" is replaced with "*Giardia lamblia*". This change is being made throughout the chapter to be consistent with itself and 40 C.F.R. part 141. Use of the term "*Giardia lamblia*" is more specific and provides more clarity.

ADOPT Section 64652(d)

This section requires suppliers serving at least 10,000 people to comply with the additional requirements of article 3.5. This section is adopted for conformance with 40 C.F.R. part 141.70(d), but has been revised to reference the applicable state regulation to avoid confusion.

AMEND Section 64652(e) (formerly 64652(d))
This section, previously assigned 64652(d), is re-assigned as (e) to allow for the insertion of the proposed subsection (d) described above.

AMEND Section 64652.5(a)
This section is amended to indicate to a supplier serving at least 10,000 people the necessity to comply with the additional filtration avoidance criteria of section 64657.10 and, if the supplier is not in compliance with section 64657.10, to comply with filtered system requirements. This section is also amended to correct typographical errors by replacing "public water systems" and "system" with "supplier" and by replacing "…Subsections…" with "… subsections…"

AMEND Section 64652.5(c)
This section is amended to correct a typographical error by replacing "…Subsections…" with "… subsections…"

AMEND Section 64652.5(e) and section 64652.5(e)(4)
The term "*Giardia*" is replaced with "*Giardia lamblia*". This change is being made throughout the chapter to be consistent with itself and 40 C.F.R. part 141. Use of the term "*Giardia lamblia*" is more specific and provides more clarity.

AMEND Section 64652.5(i)
This section is amended to require systems to comply with the requirements for total trihalomethanes, haloacetic acids (five), bromate, chlorite, chlorine, chloramines, and chlorine dioxide specified in 22 CCR chapter 15.5. Additionally, the Department removed the following language from the section: "unless the Department determines that failure to meet this requirement was not caused by a deficiency in treatment of the unfiltered approved surface water." This clause is removed for conformance with 40 C.F.R. part 141.71(b)(6).

AMEND Sections 64652.5(k)(1), 64652.5(l), and 64653(b)
The term "*Giardia*" is replaced with "*Giardia lamblia*". This change is being made throughout the chapter to be consistent with itself and 40 C.F.R. part 141. Use of the term "*Giardia lamblia*" is more specific and provides more clarity.

ADOPT Section 64653(c)(3)
This section requires systems using either conventional or direct filtration and serving at least 10,000 people to comply with the turbidity requirements specified in section 64657.30(a)(2) in lieu of subsections (c)(1) and (c)(2). It is adopted for conformance with 40 C.F.R. part 141.73(a)(3), but has been revised to reference the applicable state regulation to avoid confusion.

AMEND Section 64653(f)
This section is amended to require systems using an alternative filtration technology and serving at least 10,000 people to provide a minimum of 99 percent *Cryptosporidium* oocyst removal, and meet the turbidity performance standards established in section 64657.30(a)(2). This amendment is being made for conformance with 40 C.F.R. part 141.73(d), but has been revised to reference the applicable state regulation to avoid confusion, and to establish minimum turbidity performance standards. In addition, the term "*Giardia*" is replaced with "*Giardia lamblia*". This change is being made throughout the chapter to be consistent with itself and 40 C.F.R. part 141. Use of the term "*Giardia lamblia*" is more specific and provides more clarity.

ADOPT Section 64653.5
The purpose of this section is to govern the recycling of filter backwash water within the treatment process. It is adopted for conformance with 40 C.F.R. part 141.76 as published in 66 Fed. Reg. 31086 (June 8, 2001). The proposed language has been modified for purposes of clarity, but neither the scope nor the intent of the federal regulation has been changed. Section 64653.5, in conformance with 40 C.F.R. part 141.76(a), indicates which systems are affected by this regulation.

Subsection (a) is adopted for conformance with 40 C.F.R. part 141.76(b). It specifies what information the affected systems must report to the Department.

Subsection (b) is adopted for conformance with 40 C.F.R. part 141.76(c). It specifies how recycle flows are to be handled.

Subsection (c) is adopted for conformance with 40 C.F.R. part 141.76(d). It specifies what records are to be retained by the systems.

AMEND Section 64654(a)
The term "*Giardia*" is replaced with "*Giardia lamblia*". This change is being made throughout the chapter to be consistent with itself and 40 C.F.R. part 141. Use of the term "*Giardia lamblia*" is more specific and provides more clarity.

AMEND Section 64654(b)(2)
This section is amended to clarify the residual disinfectant compliance requirements. A detectable residual disinfectant shall be detectable in 95 percent of the samples taken each month. The previous language, requiring a detectable residual in "95 percent of the samples taken each month, during each and every two consecutive months" was vague and unclear. By removing the clause "during each and every two consecutive months" the requirement is clarified.

AMEND Sections 64654(c)(1), (2), and (3)
Minor typographical errors are corrected in these three sections to maintain consistency throughout the section.

Article 3. Monitoring Requirements

AMEND Section 64655 Treatment plant process monitoring
This section is amended by changing the title of the section from "Filtration" to the title specified above. This modification provides a title that is more descriptive and appropriate for the section.

ADOPT Section 64655(b)
The purpose of this section is to require suppliers using approved surface water sources to monitor the raw water supply at least monthly for total coliform and either fecal coliform or *E. coli* bacteria using density enumeration techniques. Such monitoring will allow for an on-going assessment of the raw water bacteriological quality and will alert the system to changes in raw water quality that may be associated with changing conditions in the watershed, climatic changes, or most importantly, unexpected changes due to unknown causes. This monitoring allows for tracking of the source water quality and the resultant need for changes in chemical pretreatment and disinfectant dosages.

Total coliforms serve as a generic indicator organism that captures a broad range of potential bacteriological contamination. Fecal coliform and *E. coli* are indicators of specific fecal or human waste contamination. Coliform monitoring has been used by the industry for many years and the Information Collection Rule (61 Fed. Reg. 24354 (May 14, 1996)) database is populated with coliform monitoring data. This regulation specifies coliform monitoring to maintain consistency with existing data sets.

This regulation establishes monthly monitoring as the minimum because monitoring on a less frequent basis would not be sufficient to identify changes in source water quality. Many systems already monitor on a more frequent basis, but many local variables must be taken into consideration when determining whether or not more frequent monitoring is beneficial. Since many systems already monitor more frequently than once per month, and nearly all monitor at least monthly, the impact of this requirement is expected to be minor.

ADOPT Section 64655(c)
The purpose of this section is to require suppliers using conventional filtration to monitor the turbidity of the settled water at least once each day. This monitoring will help both the Department and the supplier determine whether or not the pretreatment processes are optimized. The optimization of each unit process of the treatment plant is critical to overall plant performance. Such optimizing is a key component of the *Cryptosporidium* Action Plan (CAP), which was required by the state Legislature (Health and Safety Code Section 116360). (California Department of Health Services, ***Cryptosporidium Action Plan***, April 1995). To optimize the coagulation and sedimentation processes, it is necessary to monitor settled water turbidity. By receiving the results of such monitoring, the Department can review the monthly progress each system is making toward optimization.

The goal of the CAP is to reduce turbidity as much as possible prior to filtration, thereby reducing the solids loading on the filter. Reducing the solids loading on the filter strengthens the effectiveness and reliability of physical removal for particulate matter and microorganisms in

general, thereby reducing the likelihood of the disinfection barrier being over challenged. (63 Fed. Reg. 69482 (December 16, 1998).) Waterborne disease outbreaks have been associated with a high level of particles passing through a water treatment plant. (Fox, K.R.; Lytle, D.A.; ***Milwaukee's Crypto Outbreak: Investigation and Recommendations***, Journal AWWA, September 1996 (pg. 87-94).)

Daily monitoring is proposed because it provides sufficient information to determine optimization without creating a monitoring or reporting burden for the suppliers or the Department.

Given that *Cryptosporidium* is very resistant to disinfection, and that consistent removal of *Cryptosporidium* is the only reliable barrier for the protection of public health, every effort should be made to optimize the coagulation and sedimentation processes for the removal of *Cryptosporidium.* (63 Fed. Reg. 69482 (December. 16, 1998).)

Most systems already complete the monitoring and reporting that would be required by this section, and therefore the impact of this requirement is expected to be minor.

ADOPT Section 64655(d)
The purpose of this section is to require suppliers that recycle filter backwash water to monitor the turbidity and determine the flow rate of the recycled water at least once each day or during each recycle event.

This monitoring will help both the Department and the supplier determine whether or not the backwash water treatment processes are optimized. The optimization of each unit process of the treatment plant is critical to overall plant performance. Such optimizing is a key component of the CAP, which the Department has been mandated to implement (H&S Code section 116360). The handling of recycled backwash water is a unit process that is of particular importance, since backwash water has been shown to contain increased concentrations of *Giardia* and *Cryptosporidium.* (66 Fed. Reg. 31087 (June 8, 2001).)

Given that *Cryptosporidium* is very resistant to disinfection, and that consistent removal of *Cryptosporidium* is the only reliable barrier for the protection of public health, every effort should be made to optimize the recycled backwash water process for the removal of *Cryptosporidium*.

Recycled water flow rate and turbidity may have an adverse effect on plant performance, and careful monitoring of these parameters is important to ensure appropriate removals of *Giardia* and *Cryptosporidium*. By reporting to the Department under section 64664(d) the results of such monitoring, the Department can review on a monthly basis the progress each system is making toward optimization.

Monitoring once a day or during each recycle event is proposed because it provides sufficient information to determine optimization without creating a monitoring or reporting burden for the suppliers or the Department.

Most systems already complete the monitoring that would be required by this section, and therefore the impact of this requirement is expected to be minor.

AMEND Section 64655(e) (formerly 64655(b))
This section, previously assigned 64655(b), is re-assigned as (e) to allow for the insertion of the proposed subsections (b-d) described above. In addition, the Department is amending the reference to the former subsection (d) by replacing it with a reference to the re-assigned subsection (g) and adding a reference to subsection (h). The addition of the reference to subsection (h) is necessary to indicate to affected systems that turbidity compliance monitoring will be different than what is required by this section.

AMEND Section 64655(f) (formerly 64655(c))
This section, previously assigned 64655(c), is re-assigned as (f) to allow for the insertion of the proposed subsections (b-d) described above.

AMEND Section 64655(g) (formerly 64655(d))
This section, previously assigned 64655(d), is re-assigned as (g) to allow for the insertion of the proposed subsections (b-d) described above.

ADOPT Section 64655(h)
The purpose of this section is to indicate to affected systems (those using conventional or direct filtration and serving at least 10,000 people) the necessity to conduct turbidity monitoring pursuant to section 64657.40 in lieu of subsection (e). This section is necessary to inform the affected systems that the monitoring requirements presented in subsection (e) (formerly (b)) is no longer applicable.

DESIGNATE New Article 3.5. Enhanced filtration and disinfection
The purpose of this article is to provide an organized section within Chapter 17 that contains the requirements of the federal Interim Enhanced Surface Water Treatment Rule that applies to suppliers using an approved surface water and serving at least 10,000 people. The purpose is to provide an organizational structure that is easy for the regulated community to follow and understand. Systems using an approved surface water and serving at least 10,000 people shall comply with the requirements of this article.

ADOPT Section 64657 General requirements
The purpose of this section is to establish requirements for filtration and disinfection that are in addition to criteria in sections 64653 and 64654. Subsections (a) through (d) are adopted for conformance with 40 C.F.R. part 141.170(a)-(c), but have been revised to reference the applicable state regulations to avoid confusion. The requirements of the watershed control plan referred to in subsection (b) may be found in section 64657.10.

ADOPT Section 64657.10 Criteria for avoiding filtration
The purpose of this section is to establish additional requirements for suppliers that intend to avoid the necessity of providing filtration. It is adopted for conformance with 40 C.F.R. part 141.171, but has been revised to reference the applicable state regulations to avoid confusion.

ADOPT Section 64657.20 Disinfection profiling and benchmarking
The purpose of this section is to establish the record retention and reporting requirements for systems that are required to conduct disinfection profiling and benchmarking pursuant to 40 C.F.R. part 141.172. This section is adopted for conformance with 40 C.F.R. parts 141.172(a), (b), and (c). This section incorporates by reference the requirements of parts 141.172(a), (b), and (c) from 63 Fed. Reg. 69477 (December 16, 1998), "Interim Enhanced Surface Water Treatment Rule" and parts 141.172(a) and (b) from 66 Fed. Reg. 3769 (January 16, 2001), "Revisions to the Interim Enhanced Surface Water Treatment Rule and Stage 1 Disinfectants and Disinfection Byproducts Rule" as it would be too cumbersome, unduly expensive, or impractical to publish these documents into regulation. Since disinfection profiling is required to be completed before this regulation is adopted, it is not necessary for the proposed regulation to include all of the details specified in 40 C.F.R. part 141.172. Subsections (a) and (b) relate to disinfection profiling and disinfection benchmarking, respectively.

ADOPT Section 64657.30 Filtration
The purpose of this section is to establish filtration performance standards. Subsection (a) is adopted for conformance with 40 C.F.R. part 141.173, but has been revised to reference the applicable state regulations to avoid confusion. Additionally, subsection (a) differs from the federal regulation in that subparagraph (a)(2)(A) has been modified by adding "shall not exceed 1 NTU for more than 1 hour, measured pursuant to section 64657.40." The reason for this change is that the Department will require continuous compliance monitoring with data recording at intervals no greater than once every 15 minutes, as opposed to the minimum federal compliance sampling interval of once every 4 hours (40 C.F.R. part 141.74(c)). Additionally, subparagraph (a)(2)(C) is added to the proposed language to be consistent with the Department's existing performance requirements (64653(c)(2)), keeping in mind that a standard of 1 NTU is 50% greater than a standard of 1.0 NTU. The net effect is that the Department's proposed language is more stringent than the federal language.

Subsection (b) is adopted for conformance with 40 C.F.R. part 141.173(b), but has been revised to reference the applicable state regulations to avoid confusion. In addition, the proposed language is slightly different from the federal regulations to be consistent with the Department's existing language regarding alternative technologies (64653(f)). Although the language is different, the intent is essentially the same. Whereas the federal language requires a total of 99.9% *Giardia lamblia* cyst removal/inactivation and 99.99% virus removal/inactivation, the Department's language requires a minimum of 99% *Giardia lamblia* **removal** and 90% virus **removal**. Consistent with the federal regulation, the Department requires a **total** of 99.9% *Giardia* **reduction** and 99.99% virus **reduction** through both removal and inactivation (64652(a)). Essentially, the Department places a minimum **removal** requirement on the filtration technology that the federal language does not. This approach, consistent with the Department's

existing regulations regarding alternative technologies (64653(f)), ensures a quality "multi-barrier" treatment system and is necessary to ensure the protection of public health.

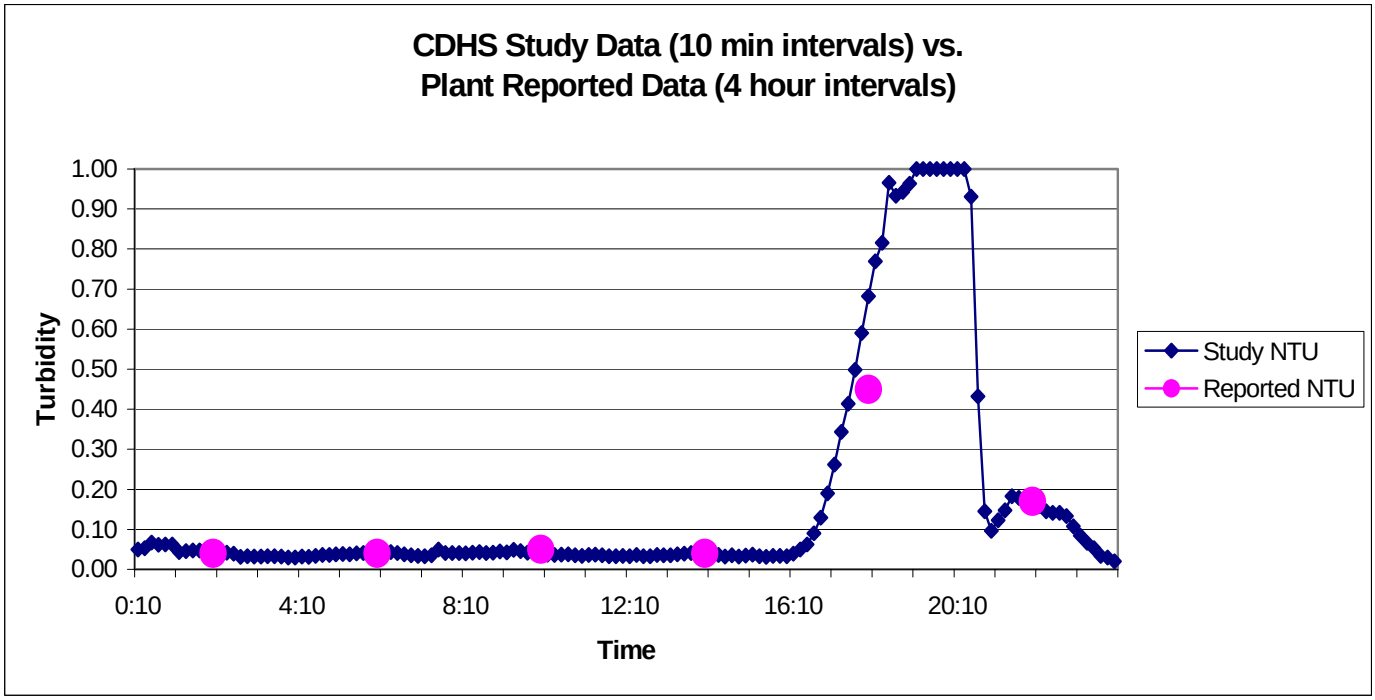
ADOPT Section 64657.40 Filtration sampling

The purpose of this section is to establish the monitoring requirements necessary for determining compliance with section 64657.30. It is adopted for conformance with 40 C.F.R. part 141.174(a) and (b), but has been revised to reference the applicable state regulations to avoid confusion.

In addition, subsections (a) and (b) are revised to require continuous monitoring of turbidity and recording of results at least once every 15 minutes for the combined filter effluent. The federal regulation requires turbidity monitoring every four hours, with compliance based on those samples collected every four hours. The Department's existing regulation already requires continuous monitoring of the combined filter effluent (64659(a)(3)), and the proposed regulation would require that compliance be based on continuous monitoring results recorded at intervals no greater than every 15 minutes.

The Department has determined that measurements recorded at 15-minute intervals are more representative of water quality leaving the plant than measurements recorded at 4-hour intervals. This was demonstrated during the Department's 2-year statewide study of particle counters. (Gilbert-Snyder, P.; ***Results of California's Statewide Particle Counting Study***, 1998 AWWA Annual Conference Proceedings, Dallas, Texas, June 21 – 25, pg. 619-644). During this study, over 20 treatment plants were evaluated with on-line particle counters and turbidimeters, recording data at 10-minute intervals. It was found that, although under ideal conditions treatment plant performance is stable, under real-world conditions treatment plant performance may be very dynamic. It is not uncommon for events to occur which cause short-term (less than 4 hour) turbidity spikes. Given that *Cryptosporidium* is very resistant to disinfection, and that consistent removal of *Cryptosporidium* is the only reliable barrier for the protection of public health, every effort should be made to reduce or eliminate these short-term turbidity spikes.

Data collected during the study demonstrated that measurements recorded at 4-hour intervals may not "capture" these short-term events, and therefore are not representative of treatment plant performance. An example of such an event is illustrated in the following graph. The total event lasted 270 minutes. For 180 minutes the combined filter effluent exceeded 0.5 NTU, and for 80 minutes it exceeded 1.0 NTU. Despite the magnitude and duration of the event, the only number reported to the Department during the event was a single reading of 0.42 NTU. If the system's reporting cycle was 60 minutes earlier, the highest reading would have been less than 0.2 NTU.



The American Water Works Association Research Foundation study titled "National Assessment of Particle Removal by Filtration" (McTigue, N.E. et al., 1998, pg. 81), found that 20% of filter runs experienced mid-run turbidity spikes with an average duration of less than 2 hours. Additionally, the study found that individual filter data collected by systems at 4-hour intervals reported less than half of the turbidity spikes that were recorded using 15-minute intervals. Again, this clearly demonstrates that turbidity measurements recorded at 4-hour intervals may not be representative of actual plant performance.

The EPA Handbook "Optimizing Water Treatment Plant Performance Using the Composite Correction Program" (EPA/625/6-91/027, February 1991, pg. 12) states "The SWTR [Surface Water Treatment Rule] requires turbidity sampling every 4 hours; however, CPE [Composite Performance Evaluation] results have indicated that even this may not be frequent enough to identify significant short-term excursions from acceptable performance."

The Department chose 15 minute intervals for two reasons: First, this is consistent with the monitoring frequency required by the federal Interim Enhanced Surface Water Treatment Rule for individual filters, and secondly, because the Department believes it is important to capture data from treatment plant spikes that may last as little as 30 to 60 minutes. Statistically, to capture an event that lasts X minutes, sampling should be conducted 1/3 X minutes. Therefore, to capture representative data of events lasting 30 to 60 minutes, one must sample once every 10 to 20 minutes. The Department proposes 15 minutes.

Finally, the manual collection and analysis of samples at 4-hour intervals is subject to errors, which could further cause the data to be non-representative of plant performance. Sample collection and handling is very sensitive to both human errors and instrument errors. Sample

glassware must be meticulously maintained and samples must be collected in a consistent fashion. Differences among procedures used by different operators could produce varying results. The use of automated on-line equipment to measure and record data nearly eliminates the potential for sample handling errors. Sample collection and handling will be identical from sample to sample, and the only opportunity for human error will be in the calibration and verification of the instruments.

Based on its own experience and the experiences reported by others, the Department believes that turbidity measurements recorded at 15 minute intervals are necessary to ensure a representative sample and to ensure consistent compliance with regulatory limits.

The impact of continuous monitoring with data recording at 15-minute intervals is not expected to be overly burdensome. Systems are already required to continuously monitor the combined filter effluent, and data recording at 15-minute intervals is required by federal regulation for each individual filter. Therefore, requiring the same for the combined filter effluent should not be a significant burden.

Subsection (c) is adopted for conformance with 40 C.F.R. part 141.174(a).

Subsection (d) is adopted for conformance with 40 C.F.R. part 141.174(b), but has been revised to address the requirements associated with combined filter effluent monitoring in the case of a failure in the continuous monitoring system. Since the federal rule does not require continuous monitoring of the combined filter effluent, it does not address this issue. In the case of a failure, grab samples will need to be collected every 4 hours and continuous monitoring will need to be reinitiated within 48 hours of failure. Continuous monitoring of the combined filter effluent is necessary to ensure proper operation of the facility and 48 hours is a reasonable period of time to correct the problem.

ADOPT Section 64657.50 Supplemental reporting and recordkeeping

The purpose of this section is to establish the monthly turbidity reporting requirements. It is adopted for conformance with 40 C.F.R. part 141.175, but has been revised to reference the applicable state regulations to avoid confusion, and has been revised in several other ways, as described below.

Subsection (a) differs slightly from the federal language in wording but not intent. The subsection only applies to systems providing conventional filtration or direct filtration, whereas the federal language also applies to alternative filtration technologies. The Department's existing regulatory language (section 64664) applies to alternative filtration technologies and includes all of the requirements of 40 C.F.R. part 141.175(a), therefore repeating the requirements in this section would be redundant.

Although the federal language specifies only one reporting option (40 C.F.R. part 141.175(a)(1) through (3)), the Department is providing two options. The first option is specified in sections 64657.50(a) and (a)(1). Subsection(a) is identical to the federal language. The first requirement in paragraph (a)(1) is different than the federal requirement in that it requires the supplier to

report the turbidity achieved 50, 90, 95, 98, and 99 percent of the time. Based on the turbidity achieved 95 percent of the time, compliance with the appropriate standard (0.3 NTU for conventional and direct filtration) can be determined. This is slightly different than the federal approach, which requires the supplier to report the number and percentage of turbidity measurements taken during the month that are less than or equal to the specified turbidity limits. The federal approach requires the reporting of a "percent of time," which in order to be in compliance must be 95% or greater, and the Department's approach requires a reporting of the turbidity value achieved 95% of the time, which in order to be in compliance must be 0.3 NTU or less. The end result is the same; it will be easy to verify whether or not the system is in compliance with the turbidity requirement. The additional data reported to the Department (the turbidity achieved 50, 90, 98, and 99 percent of the time) will allow the Department to monitor overall plant performance from month to month and quickly determine whether or not there may be a decline in performance that needs attention. The second requirement in paragraph (a)(1) is identical to the federal language, except that the turbidity reporting limit was changed from "1 NTU" to "1.0 NTU". This change is needed to determine compliance with the performance standard of section 64657.30(a)(2)(C).

The second reporting option consists of the requirements specified in section 64657.50(a) and (a)(2). As discussed above, subsection(a) is identical to the federal language. The first requirement in paragraph (a)(2) requires the reporting of turbidity measurements recorded at intervals no greater than every 4 hours, which is identical to the Department's existing Surface Water Treatment Rule monitoring and reporting requirements of sections 64655(b)[reassigned (e)] and 64664(b)(1), respectively. The second requirement in paragraph (a)(2) requires the reporting of all results that exceed 0.3 NTU, recorded at intervals no greater than every 15 minutes. Reporting of this data will allow the Department to review overall plant performance and determine whether or not there may be a decline in performance that needs attention. The third requirement of paragraph (a)(2) is identical to the requirements of 40 C.F.R. part 141.175(a)(2), except that the frequency measurements are recorded has been added for clarity.

Subsection (b) requires that the data submitted according to subsection (a) be accurate and not compromised by maintenance procedures or technical malfunctions. The intent of the section is to ensure that erroneous data are not used for compliance determinations.

Subsections (c) through (e) are consistent with the requirements of 40 C.F.R. part 141.175(b). However, the intent of subparagraph (c)(2)(B) has been modified from the federal intent. The federal language sets an individual filter effluent "trigger level" of 0.5 NTU, but it only applies at the point that the filter has been in continuous operation for 4 hours. The Department proposes to set in paragraph (c)(2)(B), the "trigger level" at 0.3 NTU and to have it apply at all times after the filter has been in continuous operation for 60 minutes.

The Department is reducing the "trigger level" to 0.3 NTU because the sedimentation and filtration processes are the most effective *Cryptosporidium* barriers. Additionally, since the *Cryptosporidium* oocysts are so resistant to disinfection, the Department places extra emphasis on the concept of filter optimization. The federal IESWTR sets the 95th percentile turbidity limit for the combined filter effluent at 0.3 NTU. After a filter has been returned to service and the

initial "start-up spike" has dissipated, the filter should run in a relatively stable state and it should perform at least as well as what is required from the combined plant effluent. If a ripened filter is producing water with a turbidity that exceeds 0.3 NTU, the combined filter effluent is meeting its limit essentially through dilution. If an individual filter cannot meet the turbidity limit set for the combined filter effluent, the filter's performance should be scrutinized.

In addition, the *Cryptosporidium* Action Plan (CAP) (Health and Safety Code Section 116360), recognizing the importance of *Cryptosporidium* removal and the limitations of disinfection, emphasizes individual filter optimization. The Department believes individual filters should be optimized, and that an optimized filter should produce water with a turbidity of 0.3 NTU or less (CAP goal for an optimized filter is 0.1 NTU). Exceedance of the 0.3 NTU individual filter turbidity "trigger level" is not a violation; it is a trigger that requires additional reporting, and possibly an investigation into filter performance. (See sections 64657.50(c)(2) and (c)(2)(B)).

The Department is reducing the trigger point to 60 minutes after filter start-up because it believes that a filter start-up spike should drop to below 0.3 NTU in less than 60 minutes. A survey conducted by the Department of 50 conventional, direct, and in-line filtration plants serving populations of 10,000 or more found that 72% could always achieve a turbidity of 0.3 NTU after only 30 minutes of filter runtime, and 96% of the plants could achieve that goal at least 90% of the time. The Department believes that if a filter takes longer than 60 minutes to drop below 0.3 NTU there is a potential problem with either the filter or the pretreatment processes, and that the performance should be evaluated.

The Department is extending the trigger point throughout the remainder of the filter run because it believes that the filter should continue to perform with an effluent of 0.3 NTU or less throughout the remainder of its run after properly ripening. The Department does not believe that filter performance should be evaluated based on one specific portion of the filter run (i.e., at 1 or 4 hours of continuous run time). If a filter begins producing water with a turbidity of greater than 0.3 NTU after it has ripened, it is likely that the filter is either beginning to breakthrough or being hydraulically "stressed," or there is a pretreatment problem. If the filter is beginning to breakthrough, the run should be terminated. If there is a pretreatment problem or hydraulic loading issue, it should be investigated. The intent of the proposed regulation is to ensure that the appropriate corrective actions take place.

The consequences of exceeding the 0.3 NTU "trigger level" are identical to those specified in the federal regulation for exceeding the 0.5 NTU "trigger level". Exceeding the 0.3 NTU level is not a violation; it is a trigger that requires additional reporting under section 64657.50(c). Exceeding the 0.3 NTU "trigger level" does not require public notification and it is not required to be included in the Consumer Confidence Report distributed to the water system's customers.

Subsection (e) also incorporates by reference the requirements of Optimizing Water Treatment Plant Performance Using the Composite Correction Program, EPA Handbook, Chapter 4, pg. 21-65, Office of Research and Development, USEPA, EPA/625/6-91/027 (revised August 1998) as it would be too cumbersome, unduly expensive, or impractical to publish this document into regulation.

Article 4. Design Standards

AMEND Section 64658(a)
References to sections 4011 and 4016 are replaced with references to sections 116525 and 116550, respectively, for consistency with recodified statutes.

AMEND Section 64660(b)(1)
This section is modified to correct typographical errors. The erroneous terms "simple media" are replaced with the correct term, "single media".

AMEND Section 64660(b)(5)
The term "*Giardia*" is replaced with "*Giardia lamblia*.". This change is being made throughout the chapter to be consistent with itself and 40 C.F.R. part 141. Use of the term "*Giardia lamblia*" is more specific and provides more clarity.

To facilitate the insertion of subparagraph (C), some grammatical changes were made by removing the "and" that proceeded subparagraph (B) and inserting it at the end of subparagraph (B).

Subparagraph (C) is added to be consistent with the requirements for alternative technologies. The Department considers filters that are operating at more than 2 times the rates specified in paragraphs (b)(1) through (3) as alternative filtration technologies, and as such, must meet the requirements shown as amendments to section 64653(f). Subparagraph (C) is added to be consistent with those requirements.

AMEND Section 64661(a)
This section is amended to clarify that all treatment plants are required to operate under an approved operations plan and that the plans must be updated whenever modifications are made. Operation plans specify how plants will be operated on a daily basis and how compliance monitoring will be conducted. Keeping the plans up-to-date will help to ensure the protection of public health.

AMEND Section 64661(b)
This section is amended to require that the operations plan include a description of the utility's filter media inspection program. The filtration portion of a surface water treatment facility is the final barrier for removing pathogens such as *Giardia*, *Cryptosporidium*, and viruses. The removal of *Cryptosporidium* during the filtration process is very important since it is difficult to inactivate with most disinfectants, effectively eliminating the typical "multi-barrier" concept. Furthermore, in direct filtration facilities, the filtration step is the only barrier for *Giardia, Cryptosporidium,* and virus removal. The Department believes a regular schedule of formal filter inspections is necessary to ensure proper filter operation. A physical inspection of the filters may provide an initial indication of future filter performance problems and would give the utility an historical record of the condition of the filter media. The results of the inspections may be used to determine if the media needs to be added to, modified, or replaced. Potential problems with underdrain systems may also be detected during filter inspections. The

Department believes routine inspections of all filters will reduce the likelihood of performance problems at treatment facilities.

AMEND Section 64662(a)(1)
Amendments to this section extend the existing record keeping requirements to include monitoring data collected pursuant to sections 64657.20, 64657.40, and 64657.50. This requirement is consistent with existing regulatory requirements for record keeping.

AMEND Section 64662(b)
The first amendment to this section extends the record retention requirement from two years to three years. It is amended for conformance with 40 C.F.R. part 141.175(b). The second amendment to this section replaces references to sections 4031 and 4038 with references to 116625 through 116675 and 116725 through 116730, respectively, for consistency with recodified statutes.

AMEND Section 64663(a)
Amendments to this section extend Department notification requirements to include notification whenever combined filter effluent turbidity measurements collected pursuant to section 64657.40 exceeds 5.0 NTU. This requirement is consistent with existing regulatory requirements for Department notification.

AMEND Section 64663(b)
Two amendments are made to this section. First, the section is amended to include Department notification whenever turbidity measurements conducted pursuant to section 64657.40 exceeds 1 NTU for more than 1 hour. Since the Department is requiring the use of continuous on-line turbidimeters and such instruments operate automatically and are not subject to continuous human oversight, it is possible that the automated system may malfunction and provide erroneously elevated results. The Department recognizes that it may take an operator a short period of time to react to elevated measurements and determine whether or not the measurements are truly representative of plant performance. Therefore the Department would permit a 1-hour period of time for determining compliance status and responding to the event. If after 1 hour either the erroneous instrumentation is not fixed or removed from service, or the actual "event" has not been remedied, Department notification is required. (See sections 64657.30(a)(2)(A) and 64663(b)).

The second amendment requires Department notification whenever turbidity measurements conducted pursuant to section 64657.40 exceeds 1.0 NTU for more than 8 consecutive hours. This amendment is consistent with the existing requirements specified in this section.

ADOPT Section 64664(d)
The purpose of this section is to specify the reporting requirements for data collected pursuant to sections 64655(a) through (d). In order for the Department to evaluate and monitor overall plant performance it is important that this data be reported to the Department in a timely manner.

AMEND Section 64664(e) (formerly 64664(d))
This section, previously assigned 64664(d), is being re-assigned as (e) to allow for the insertion of the proposed subsection (d) described above. To be consistent with existing reporting requirements, the requirements of this section are extended to include any violation of performance standards specified in section 64657.30. Additionally, replacing the reference to sections 64660(b)(6) and (8) with a reference to sections 64660(b)(7) and (9) corrects a typographical error.

AMEND Section 64664(f) (formerly 64664(e))
This section, previously assigned 64664(e), is being re-assigned as (f) to allow for the insertion of the proposed section (d) described above.

ADOPT Section 64664(g)
This section is adopted to indicate to a supplier using conventional filtration or direct filtration and serving at least 10,000 people the necessity to comply with the additional reporting requirements of section 64657.50.

AMEND Section 64666(a)
This section is amended to include public notification whenever there is a failure to comply with the treatment requirements specified in sections 64653.5(b), 64657.30(a)(2), or 64657.30(b). It is amended for conformance with 40 C.F.R. part 141.76 (66 Fed. Reg. 25982 (June 8, 2001)). Additionally, to clarify the intent of the section, the phrase "any of" is inserted into the section. This amendment clarifies that the intent is that notification is required whenever there is a failure to meet any of the specified requirements.

AMEND Section 64666(c)
This section is amended to refer to sections 64463.1 and 64463.4 as a whole, as opposed to specific subsections within those sections, in order to provide clarification that the public notification requirements are inclusive of the entire sections, including the manner and timeframe that notification must be given.

AMEND Section 64666(d)
This section is amended to include public notification whenever there is a failure to comply with the monitoring requirements specified in section 64657.40. It is amended for conformance with 40 C.F.R. part 141.204.